a

what is claimed is
Patent ~~Claims~~

1. Adjusting device for displacing individual elements (2) of optical systems or of measuring systems, wherein the element (2) to be displaced is movable on a base along a predetermined direction (x) by means of a piezoelectric actuator arrangement (4, 5, 6; 21, 22; 31) which is supported by the element (2) and which is constructed and controllable in such a way that it exerts shock pulses on the element (2) in order to carry out a stepwise movement of the element (2) on the base (1), wherein the element (2) is arranged in a body (1; 27) which has an open or closed hollow cross section and is supported in a frictional engagement on this body, at least at one location, with the intermediary of a pretensioned spring device (8, 8'; 15, 16).

2. Adjusting device according to claim 1, wherein the body (1; 27) has a U-shaped cross section or a circular hollow cross section.

3. Adjusting device according to claim 1 or 2, wherein the element has a plate (2) whose shape is substantially adapted to the inner cross section of the body (1; 27) and the pretensioned spring device comprises a strip (18) extending at least partially along the outer circumference of the plate (2) and has spring tongues (8, 8') which project laterally, preferably over the front side and rear side of the plate (2), and are arranged at a distance from one another, these spring tongues extending diagonally from the strip (18) in the direction of the associated inner wall of the body (1; 27) and resting against the latter under spring pressure.

4. Adjusting device according to claim 3, wherein another, second plate (20) whose shape likewise corresponds substantially to the inner shape of the hollow cross section of the body (1) is provided parallel to the displacing element (2), but is not provided with a spring device and is connected with the element (2) to be displaced by a tubular piezo actuator.

09580722.021302

~~5. Adjusting device according to claim 3, wherein a piezoelectric plate actuator (21, 22) extending parallel to the respective side surface of the body (1) is fastened by one end in the vicinity of the two sides (18) on which the spring tongues (8) are arranged, wherein the two free ends of the two piezoelectric plate actuators (21, 22) are fastened in turn to a second plate (20) arranged parallel to the element (2) to be displaced, wherein the shape of the second plate (20) like corresponds substantially to the inner shape of the hollow cross section of the body (1; 27) which, however, is not provided with a spring device.~~

~~6. Adjusting device according to claim 4 or 5, wherein the element in the form of a plate (2) and/or the second plate (20) have a receptacle for holding a lens (19).~~

~~7. Adjusting device according to one of claims 1 to 6, wherein a measuring head (23) for scanning a measurement strip (25), a bar code, or the like, is arranged at the element (2) to be displaced, preferably at its terminating surface in the front or back in relation to the given direction.~~

~~8. Adjusting device according to claim 1, wherein the body is formed of a plate (2), wherein a plate-shaped piezo actuator (4) which is arranged substantially at right angles to the respective plate surface is fastened to the two plate surfaces of the plate (2), and this piezo actuator (4) can be deflected in the desired movement direction of the plate (2) when its end projecting from the plate (2) is acted upon.~~

~~9. Adjusting device according to claim 8, wherein a mass body (5, 6) is fastened to the free ends of the two plate actuators (4).~~

09807222.021302

~~10. Adjusting device according to claim 9, wherein the two plate actuators (4) and the mass bodies (5, 6) arranged at their free ends are arranged symmetric to the longitudinal center plane of the plate (2).~~

~~11. Adjusting device according to one of claims 7 to 9, wherein the two piezo actuators are formed by a plate actuator (4) which is guided through the plate (2).~~

~~12. Adjusting device according to claim 1, wherein the element (2) to be displaced is constructed so as to be substantially tubular, is arranged concentrically in the likewise tubular body (1) and is fastened at one axial end to a radially enlarged guide disk (43) which is supported on the inner surface of the tubular body (1) with the intermediary of at least one spring element (44), and wherein the piezoelectric actuator is constructed as a disk-shaped piezo actuator (40) which is supported in turn, with the intermediary of at least one spring element (41), on the inner surface of the tubular body (1).~~

~~13. Adjusting device according to claim 12, characterized in that the disk-shaped piezo actuator (40) is connected on one axial side to the element (2) to be displaced by an elastic, tubular coupling member (42).~~

~~14. Adjusting device according to claim 13, wherein the disk-shaped piezo actuator (40) carries a mass (45) on its side located opposite from the element (2) to be moved, which mass (45) is arranged concentric to this element (2).~~

add a1

09580722.021302